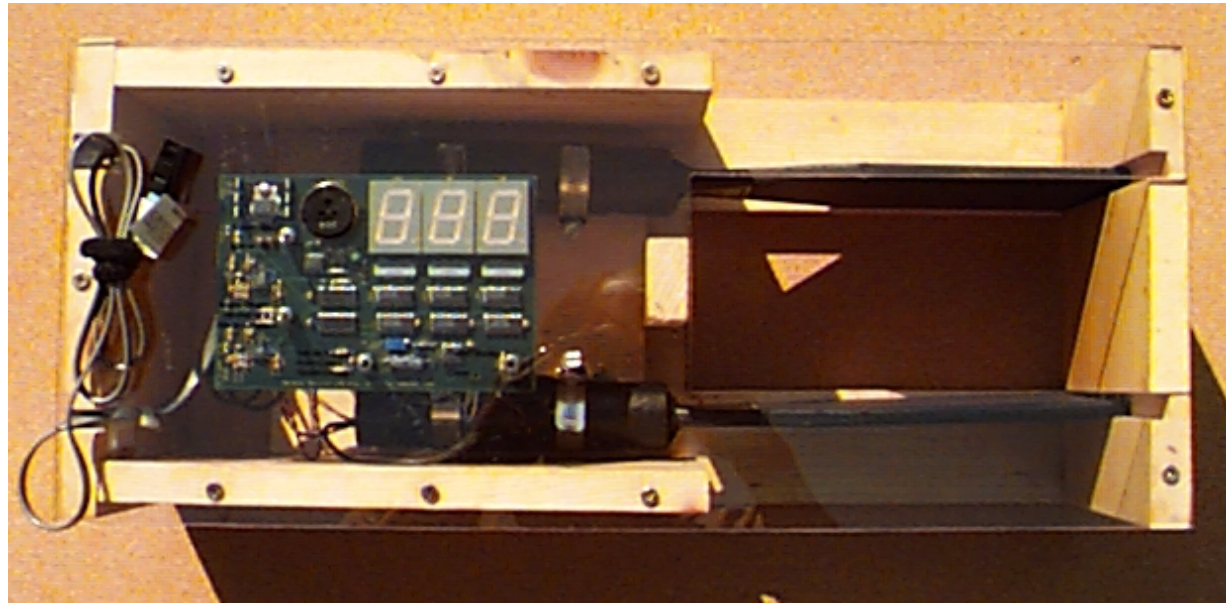




A Simple Cosmic Ray Telescope



Presented by Andria Erzbeger, Lawrence Berkeley Laboratory

Talk written by Howard Matis, LBL, hsmatis@lbl.gov

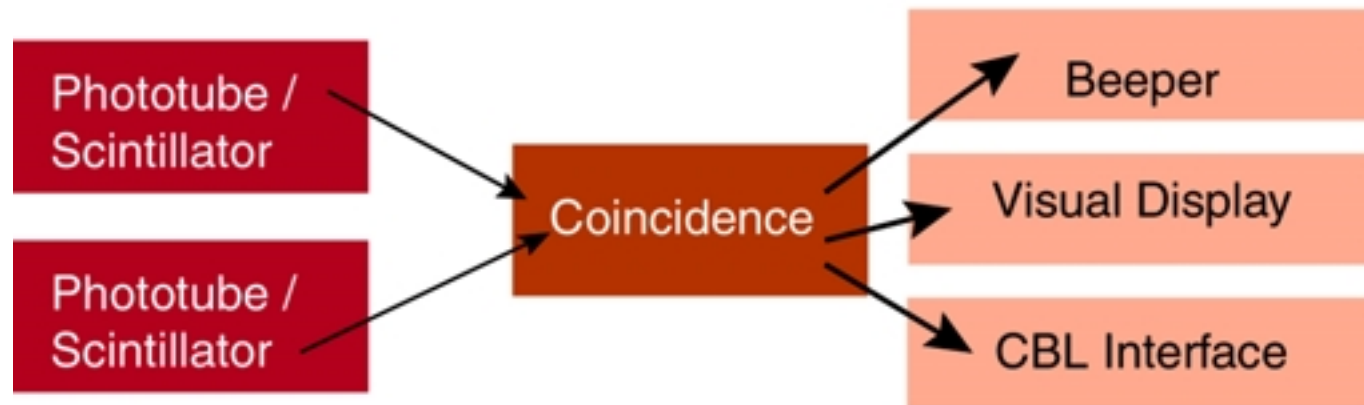


Requirements

- ◆ Make quantitative measurements
- ◆ Easy to use and interpret
- ◆ Make repeatable directional measurements
- ◆ Portable
- ◆ Fairly inexpensive
- ◆ Rugged to transport
- ◆ Easy to build



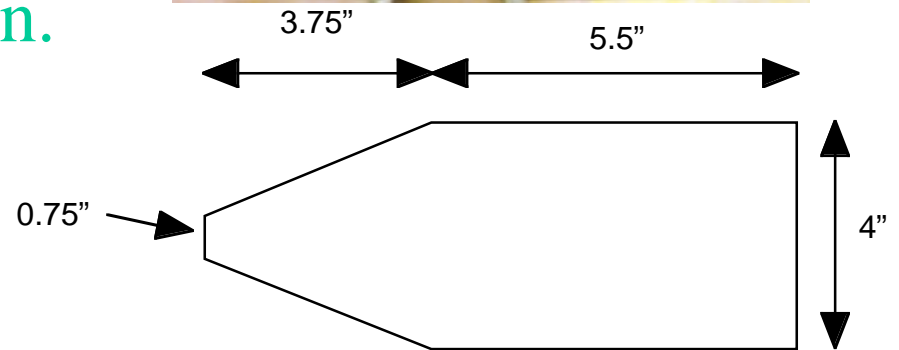
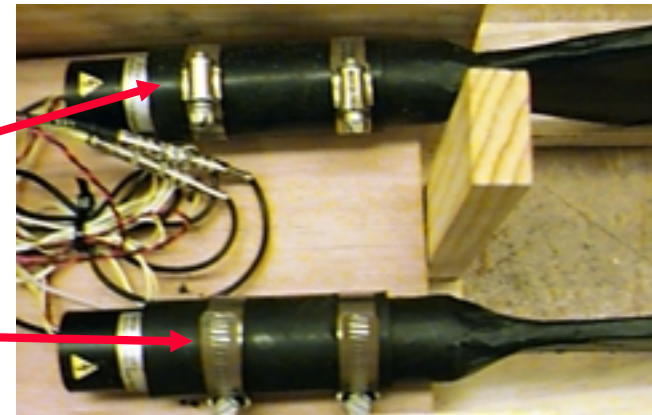
Functional Detector





Detector

- ◆ Use “Electron Tube” integrated base and phototube
- ◆ Scintillator in one section.
- ◆ No light pipe makes the detector much less resistant to transport damage
- ◆ Might be able to polish only one edge





Circuit Board

- ◆ Integrated circuit board
- ◆ Simple parts
- ◆ Use cheap comparitor to measure coincidence
- ◆ Use long coincidence time
– 700 ns
- ◆ Functions include
 - Timer or indefinite
 - Beeper (on or off)
 - Coincidence or singles
 - CBL output



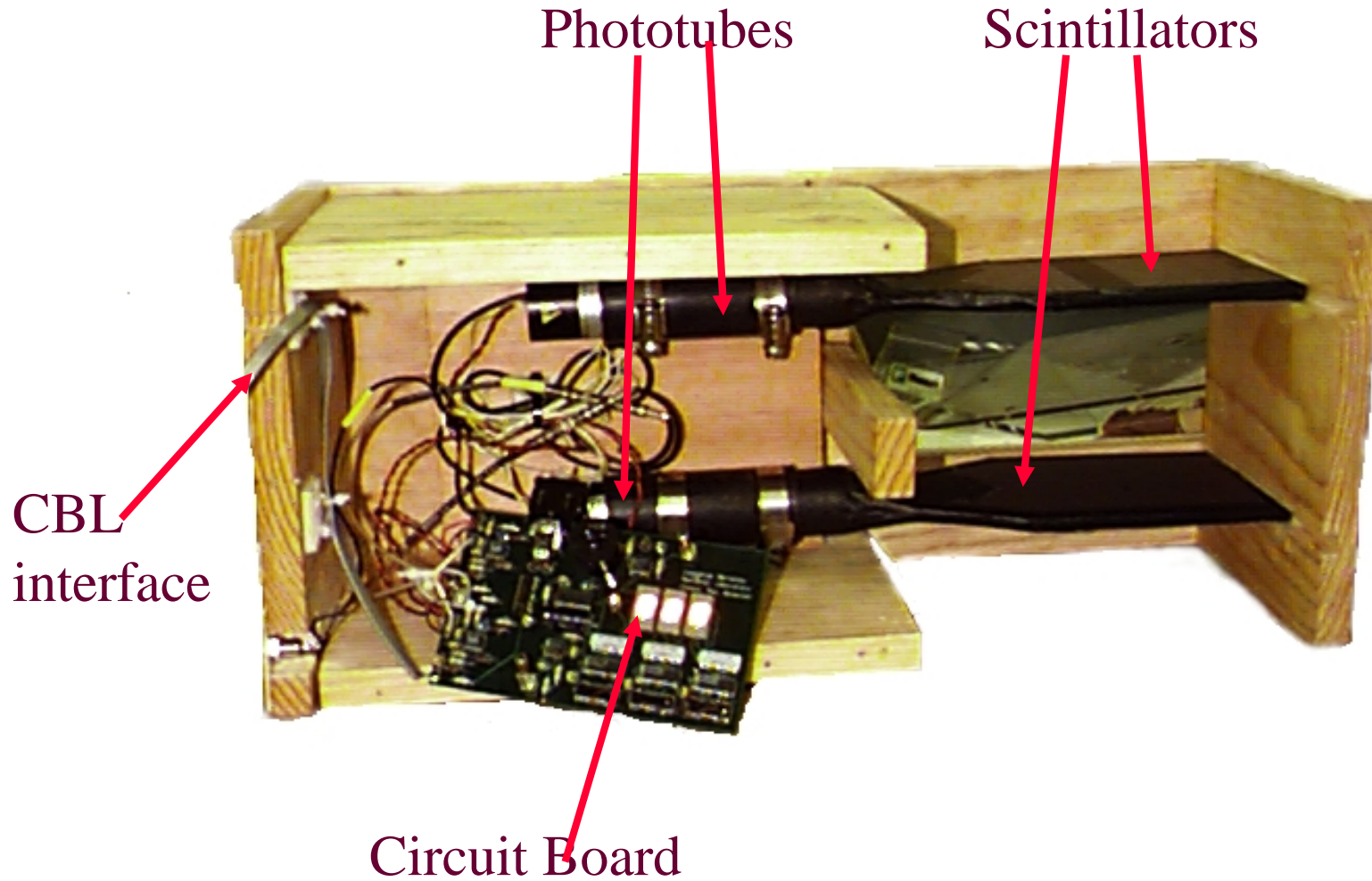


Measurements

- ◆ **Cosmic Rays**
 - Flux and direction of cosmic ray
 - Rough energy analysis (use absorbers)
- ◆ **Singles Mode**
 - Measure radioactivity
- ◆ **Mathematics**
 - Measurement of a random phenomena
 - Describe statistical significance of a measurement
 - Describe coincident method for experiments

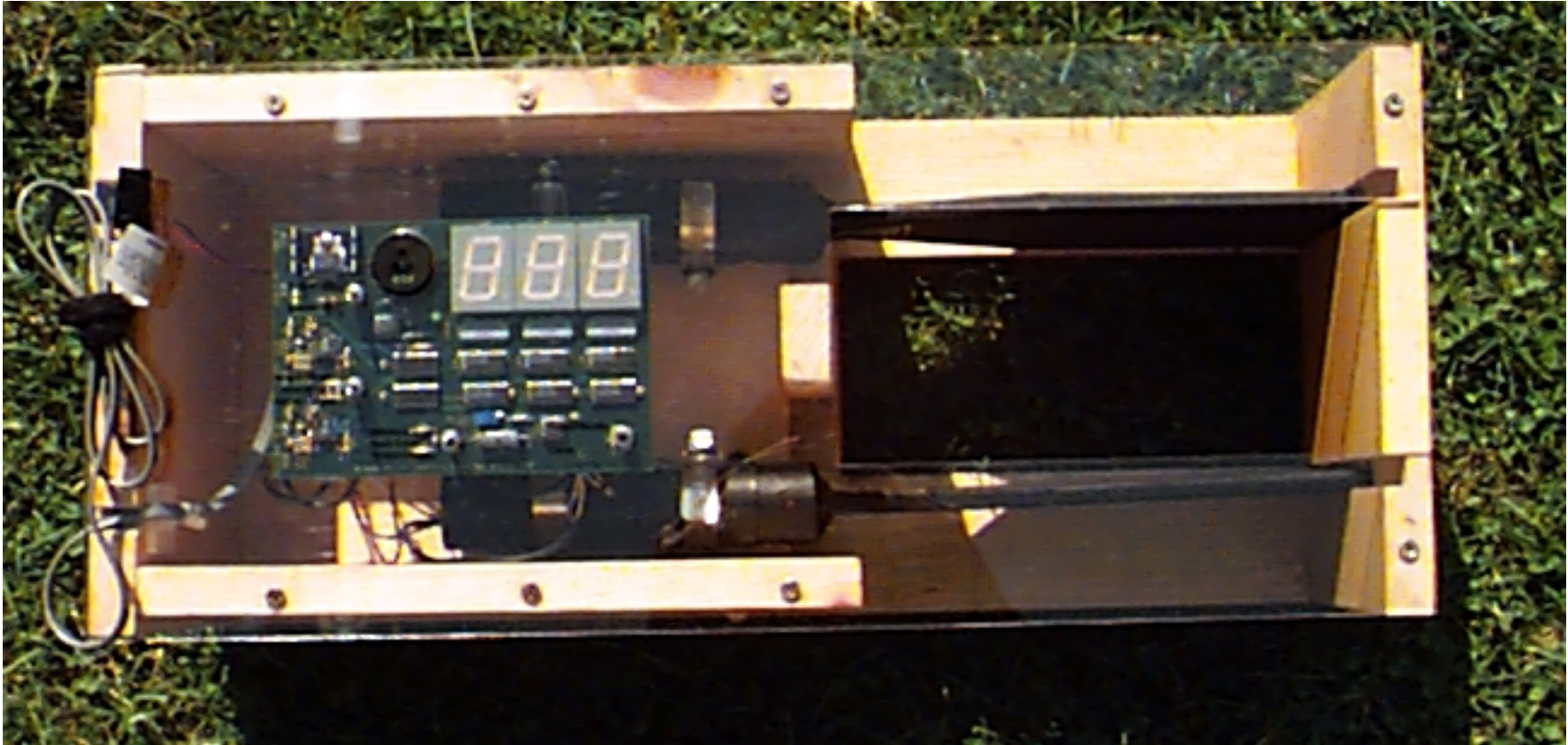


The Detector - Unassembled





The Detector Finished





Past Experience

- ◆ Many workshops demonstrating these devices
- ◆ This year workshop at MSU built two detectors
- ◆ Students and teachers enthusiastic



Summary

- ◆ Detectors work
- ◆ Two preliminary documents available
- ◆ Future documentation in progress
- ◆ A few available for short term borrowing
- ◆ Want to work with groups to improve documentation
- ◆ Need to put detector online
- ◆ Circuit boards are available for interested parties